

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) DISPOSABLE TRAYS

(71) We, PLASTICS INC. a Corporation organised and existing under the laws of the State of Delaware United States of America of 224, Ryan Avenue, Saint Paul, Minnesota 55102, United States of America, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to an improvement in disposable trays and deals particularly with a tray frame capable of supporting a series of disposable receptacles for use in containing various meal courses such as those served on airplanes.

With the increase in size and speed of commercial airliners, the problem involved in serving meals has become increasingly difficult. Furthermore, as the number of passengers increases, the weight of the trays, dishes and the like used in serving the meals correspondingly increases. In order to maintain a high pay load on the plane, the weight of the trays and dishes used in serving meals should of necessity be at a minimum.

With the increase in passenger travel, the problem of serving the food onto the trays also increases. It is entirely possible to move serving trays by a series of stations and to insert the entree, the salad the dessert, and the other side dishes into the tray during such movement. However, the food must be served attractively, and must be arranged more carefully than would be possible if the serving tray were filled on an assembly line. For this reason it has now been found preferable for the airline, or the catering company serving the airline, to prepare the food in individual receptacles and then to insert these receptacles into or upon a serving tray in the procedure of preparing the meals for service.

In accordance with this invention a disposable tray includes a tray frame having peripheral walls including a top flange and a downwardly extending flange connected to the inner edge thereof, partition members extending between opposite sides of said frame and divid-

ing the latter into a plurality of compartments, each partition member being of inverted channel-shaped cross-section including a top flange coplanar with the top flange of said frame member and downwardly extending flanges connected to opposite edges thereof, the frame and the partition members being formed of resilient plastics material, receptacle supporting means extending into at least some of the compartments from the lower edges of the frame and the partition members, a receptacle in each of said compartments, the receptacles resting upon the receptacle supporting means where provided, inwardly and downwardly inclined cam projections on the resilient downwardly extending flanges of the frame and the partition member and in each of said compartments having the receptacle supporting means, the cam projections serving to engage said receptacles to hold them in position in the tray frame.

The individual receptacles may be filled in various sections of the restaurant or catering service. For example, the entree of the meal may be inserted in one receptacle, a vegetable or salad may be inserted in another, a dessert may be inserted in another and so forth. Each of the receptacles may be individually prepared in sections of the restaurant or catering establishment. Accordingly, in order to assemble the entire meal, it is only necessary to pass the tray frame past a series of stations, and to insert a receptacle in the tray frame at each of such stations. As a result, each portion of the meal may be carefully and attractively prepared and added to the tray frame during the process of assembling the meal.

One of the receptacles may be integrally formed with the frame to accommodate utensils or napkins. This integral receptacle serves to stiffen and strengthen the tray, and to simplify the handling of the tray before the other receptacles are inserted thereinto.

The preferred embodiment of the invention is described hereafter with reference to the accompanying drawings, wherein:—

Figure 1 is a top plan view of a tray frame of the embodiment,

[Price 25p]

Figure 2 is a perspective view of one of the disposable receptacles used in conjunction with the frame shown in Figure 1,

Figure 3 is a perspective view of an assembled tray showing the tray frame and the various disposable receptacles inserted therein,

Figure 4 is a perspective view of a corner of the tray frame,

Figure 5 is a vertical sectional view through a portion of the frame and one of the receptacles, showing the manner in which the receptacles are locked in place in the frame,

Figure 6 is a sectional view similar to that shown in Figure 5, but showing the receptacle being inserted into the tray frame,

Figure 7 is a sectional view on the line 7—7 of Figure 3, and

Figure 8 is a view similar to Figure 4, but showing the tray frame deflected as in the insertion of one of the receptacles.

As will be understood, the supporting tray frame and the removable receptacles, or dishes may be produced in a great number of different forms and combinations. The number of dishes inserted into the tray frame largely depends upon the size of the meal being served. As an example, a luncheon tray is produced which embodies a fixed compartment and three removable dishes. The particular structure illustrated includes a single fixed compartment, and five removable dishes supported by the tray frame. In using the term "removable" it is not intended to imply that the dishes are ordinarily removed from the tray frame once they are inserted. However, it is possible to move the dishes; and while the tray frames and dishes are normally disposable, it would be possible for them to be cleaned and reused.

As is perhaps best illustrated in Figures 1 and 3 of the drawings, the supporting tray frame includes a pair of longitudinally extending frame members 10 and 11, and a pair of parallel end members 12 and 13 which are arranged at right angles to the longitudinal frame members 10 and 11 and connect the ends of the same. As illustrated in Figures 4 and 5 of the drawings, the four sides of the frame each include a top flange 14 which is on a common plane and encircles the frame member, an outwardly and downwardly inclined outer flange 15 which extends about the periphery of the flanges 14, and a downwardly and inwardly inclined flange 16 extending about the major portion of the frame. A longitudinally extending partition member 17 extends from one end member 12 to the other end member 13 and includes a top flange 19 which is coplanar with the top flange 14, and downwardly inclined flanges such as 20 projecting downwardly from opposite edges of the top partition flange 19, as indicated in Figure 7.

Partition member 21 and 22 extend between the frame side member 10 and the longitudinal partition member 17 in parallel spaced relation

to the frame end member 12 and 13. The area between the partitions 21 and 22 and the frame side member 10 and the partition member 17, is filled by an integral receptacle or tray 23 including longitudinal walls such as 24 which extend downwardly and inwardly from the frame side member 10 and the partition member 17, end walls 25 extending downwardly and inwardly from the partitions 21 and 22, and a bottom panel 28 which forms the bottom of a fixed tray or receptacle forming a part of the tray frame. The integral tray receptacle 23 substantially stiffens the tray frame, and forms a support for utensils and other items which need not or cannot be readily included in the inserted dishes.

As is perhaps best illustrated in Figure 4 of the drawings, supporting legs 29 are provided at the four corners of the tray frame. Partition members 26 and 27 extend from the partition member 17 to the frame member 11, the partition members 26 and 27 extending parallel to the end members 12 and 13. The legs 29 are formed as illustrated in Figure 4 of the drawings and in view of the fact that all of the legs are generally similar in construction, only one such leg is illustrated in Figure 4. However, the position of the various legs is illustrated in Figure 1. Each leg 29 includes a right angular horizontal flange 30 connected to the lower edges of the flanges 16 at the corner junctures thereof to extend inwardly therefrom. A pair of mutually right angularly extending leg panels 31 and 32 extend downwardly from the inner edges of the right angular flange 30, and the lower edges thereof are connected by a generally triangular base portion 33. The base 33 of each leg is preferably on the plane of the bottom panel 28 of the receptacle 23 so that the receptacle 23 may serve to assist in supporting the frame.

While the legs shown in detail in Figure 4 have been indicated in general by the numeral 29, as indicated in Figure 1 of the drawings, these legs 29 are provided at the juncture between the longitudinal frame side member 10 and at the end members 12 and 13 of the frame. Identical legs 34 are provided at the juncture between the longitudinal side member 11 of the frame and the end members 12 and 13 thereof. Similar legs 35 are shown at the juncture between the end members 12 and 13 of the frame and the longitudinal partition member 17. Additional supporting legs 36 are shown at the juncture between the longitudinal frame side member 11 and the partition members 26 and 27. These legs, combined with the under surface of the receptacle 23, form a firm support for the tray frame even when the frame is formed of relatively thin walled plastics material. It should be mentioned that the thickness of the walls of the tray frame and dishes shown in Figures 4, 5 and 6 of the drawings is exaggerated, as the frame and the disposable dishes supported

thereby are of a thickness of perhaps 0.045 inches.

Lateral horizontal angular flanges 37 are provided extending inwardly from the inner flange 16 of the longitudinal wall 10 and corresponding inner flange of the partition 21 and the inner flange of the partition 22. These angular or L-shaped flanges 37 are on the same plane as the flanges 30 at the upper end of each leg 29. Flanges 39 are provided at the juncture of each end member 12 or 13 and the partition member 17. Similar flanges 40 are provided at the junctures between the partition member 17 and the partitions 21 and 22. The flanges 39 and 40 are on a common plane with the flanges 30 and 37 and are designed to support the peripheral flange of a disposable dish thereupon.

Horizontal flanges 41 are provided at the corners between the partition members 26 and 27 and the longitudinal partition member 17. Opposed right angular flanges 42 are provided at the junctures between partition members 26 and 27 and the longitudinal frame member 11. The rectangular compartments formed in these areas are designed to support disposable dishes, the peripheral flanges of which are designed to rest upon the flanges 30 of the corner legs, at two corners of each of these compartments, and the flanges 41 and 42 at the opposite two corners of each of these compartments. The flanges are on a common plane.

The space between the partition members 26 and 27, and between the longitudinal frame member 11 and the longitudinal partition member 17 also provides a rectangular recess designed to accommodate an intermediate disposable dish. The corners of this rectangular intermediate compartment adjoining the longitudinal tray frame member 11 are provided with legs 36 having horizontal flanges 30. Flanges 43 are provided at the junctures between the longitudinal partition members 17 and the transverse partition members 26 and 27, these flanges 43 being on a common plane with the flanges 30 of the legs 36. The flanges 30 and 43 are designed to support the peripheral flange of a disposable dish inserted into this portion of the tray.

In view of the fact that a variety of dish sizes is desirable, different identifying numerals have been given to the dishes of different sizes. The fixed receptacle 23 has been described. The frame end recesses on opposite sides of the receptacle 23 which are between the end member 12 and the partition 21, and between the end member 13 and the partition 22 are designed to accommodate dishes 44. The centre area between the partition members 26 and 27 and between the frame member 11 and the intermediate partition member 17 accommodates a dish 45 which is usually designed to accommodate the entree of the meal. The recesses on opposite sides of the dish 45 positioned between the

end member 12 and the partition member 26, and between the end member 13 and the partition member 27, are designed to accommodate the dishes 46. In view of the fact that the dishes 44, 45 and 46 are identical except in size, similar identifying numerals for the various walls forming the dishes have been used. As an example, one dish 44 is indicated in Figure 2 of the drawings. A transverse section through this dish is indicated in Figure 5 of the drawings, and Figure 7 is a sectional view taken at right angles to Figure 5. As will be noted, all four sides of the dish are similarly constructed.

As indicated in the Figures mentioned, each dish such as 44 includes a generally rectangular bottom panel 49, upwardly and outwardly inclined end walls 50, and outwardly and upwardly inclined side walls 51. The side and end walls join at the corner to form a tray. The side and end walls 50 and 51 terminate in short outwardly turned flanges, the end flanges being indicated by the numeral 52, and the side flanges being indicated by the numeral 53. Downwardly and outwardly inclined walls are provided on the outer edges of the end flanges 52, these walls being indicated by the numeral 54. The side walls are also provided with downwardly and outwardly inclined flanges 55 integral with the outer edges of the peripheral flanges 53 as indicated in Figure 4. The lower edges of the outer walls 54 and 55 terminate in outwardly directed coplanar flanges 56 and 57.

This arrangement provides a dish having an inverted channel-shaped encircling wall which lends considerable strength to the dish. This channel-shaped wall combined with the outwardly directed flange which confines the wall to a predetermined outline provides a dish which is capable of supporting the desired weight of food, even though it is produced of thin sheet plastic. The inverted channel-shaped edge about each of the dishes when inserted in the frame extends substantially to the surface of the top flange 14 of the encircling frame so that the entire tray combined with the dishes is of generally uniform height so that the trays may be stacked one upon the other even when filled with the food.

Means are provided for retaining the dishes in the frame when inserted thereinto. It will be understood that the peripheral flanges 56, 57 of each dish is supported by the various flanges 30, 37, 39, 40, 41, 42 and 43.

As indicated in Figures 4 and 8, a slot 60 is provided centrally of each wall of each of the dish containing compartments, the slots being at the juncture of the top flanges such as 14 or 19 and the flanges such as 16 or 20 which extend downwardly and inwardly therefrom. The slots 60 separate the top flange from the downwardly and inwardly inclined flange in such a manner that the downwardly and inwardly inclined flange may flex out-

wardly of the compartment to extend beneath the top flange to which it is connected. A cam projection 61 is located in the downwardly and inwardly inclined flange near the center portion of each slot 60, the cam projection 61 being short relative to the length of the slot 60. As the dish is forced downwardly into each of the dish containing compartments of the tray, the peripheral flanges 56, 57 of the dish engage against the cam projections 61, deflecting the portions of the flanges bearing the cam projections 61 outwardly of the compartment. The lower end 62 of each cam projection 61 is slightly above the level of the flanges such as 30. Accordingly, when the peripheral flanges 56, 57 are moved into face contact with the various flanges at the corners of the dish compartment, the peripheral flanges become disengaged from the cam projections 61 and the walls supporting the cam projections flex back into their normal positions overlying the peripheral flanges of the dish.

With this arrangement, the various dishes may be filled with the proper foods, and each dish may be placed in its compartment with the peripheral flanges 56, 57 of the dish resting upon the cam projections 61. Downward pressure on the dish causes the cam projections to flex outwardly, as the dish is lowered into the compartment, until the cam projections finally snap over the peripheral flanges and lock the dish in place.

Once assembled, and used, the tray frame and its dishes are normally discarded. However, the dishes may be removed by flexing outwardly the portions of the downwardly and inwardly inclined flanges beneath the slots 60 to disengage the peripheral flanges of the dish from the cam projections.

#### WHAT WE CLAIM IS:—

1. A disposable tray including a tray frame having perimetral walls including a top flange and a downwardly extending flange connected to the inner edge thereof, partition members extending between opposite sides of said frame and dividing the latter into a plurality of compartments, each partition member being of inverted channel-shaped cross-section including a top flange coplanar with the top flange of said frame member and downwardly extending flanges connected to opposite edges thereof, the frame and the partition members being formed of resilient plastics material, receptacle supporting means extending into at least some of the compartments from the lower edges of the frame and the partition members, a receptacle in each of said compartments, the receptacles resting upon the receptacle supporting means where provided, inwardly and downwardly inclined cam projections on the resilient downwardly extending flanges of the frame and the partition member and in each of said compartments having the receptacle

supporting means, the cam projections serving to engage said receptacles to hold them in position in the tray frame. 65

2. A tray according to Claim 1 wherein in one of the compartments, the receptacle is integral with the frame and the partition members defining the compartment, the remaining compartments having the receptacle supporting means. 70

3. A tray according to Claim 2 in which the downwardly extending flanges of the frame and the corresponding partition members form the side walls of said integral receptacle, the latter including a bottom panel connecting the lower edges of said side walls. 75

4. A tray according to Claim 1, 2 or 3 and including legs depending downwardly from said frame and having bottom support faces in a common plane. 80

5. A tray according to Claim 4 as appendant to Claim 3, wherein the bottom panel is coplanar with the bottom support faces of the legs. 85

6. A tray according to any one of the preceding Claims in which said frame and the compartments are each substantially rectangular. 90

7. A tray according to Claim 6 in which the receptacle supporting means are located at the corners of the compartments.

8. A tray according to Claim 6 or 7 in which the cam projections are located intermediate the corners of the compartments. 95

9. A tray according to any one of the preceding Claims in which each receptacle resting upon receptacle supporting means has perimetral flanges which are engaged by said cam projections. 100

10. A tray according to any one of the preceding Claims including slots in the frame and the partition members along the junction between top flanges and the downwardly extending flanges above each of said cam projections, the slots permitting the portions of the flanges supporting said cam projections to flex. 105

11. A tray according to any one of the preceding Claims in which each of the receptacles resting upon the receptacle supporting means includes a bottom panel and side and end walls, downwardly and outwardly inclined perimetral flanges at the upper edges of said side and end walls and a perimetral flange at the lower edge of said downwardly and outwardly inclined flanges extending parallel to the bottom panel. 115

12. A tray according to any one of the preceding Claims in which the downwardly extending flanges of the frame and the partition members incline downwardly and inwardly of the respective compartments. 120

13. A disposable tray constructed substantially as herein described and illustrated in the accompanying drawings. 125

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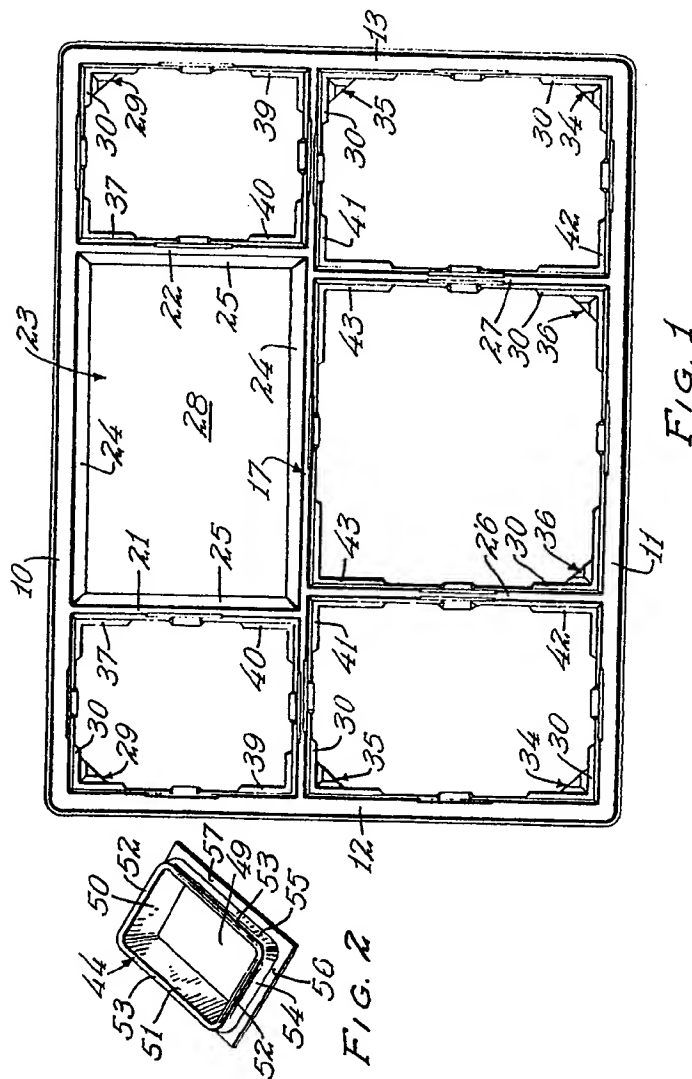
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COMPLETE SPECIFICATION

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Sheet 1



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Sheet 2

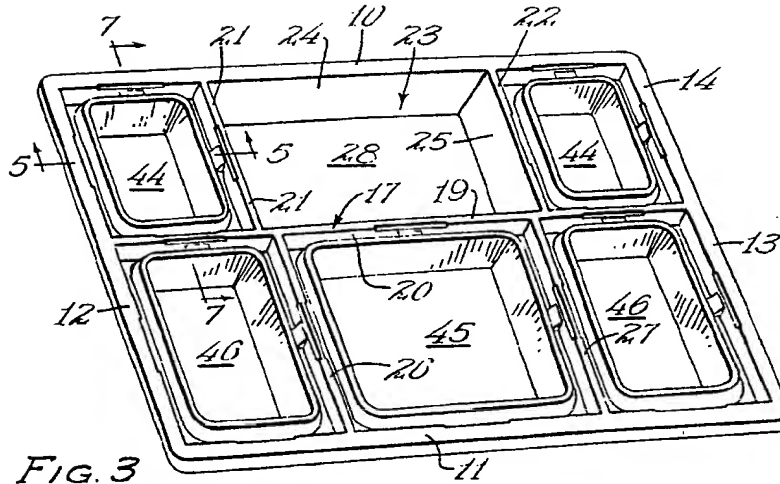


FIG. 3

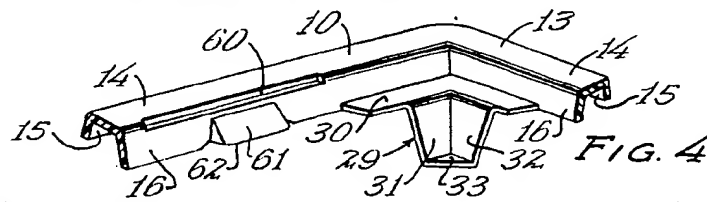


FIG. 4

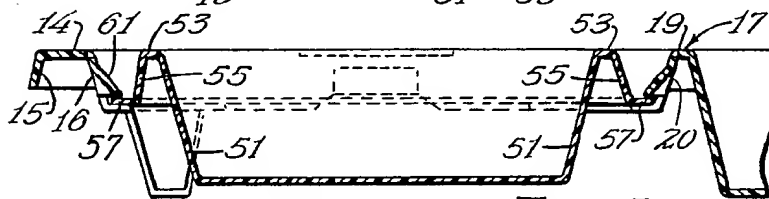


FIG. 5

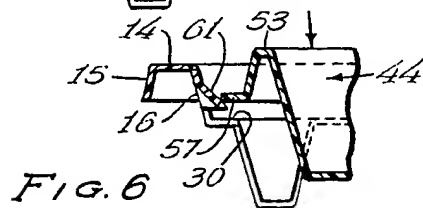


FIG. 6

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Sheet 3

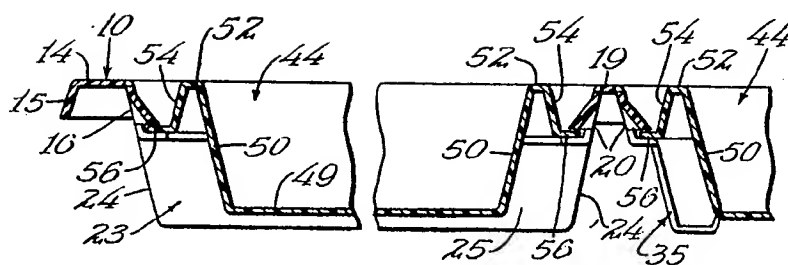


FIG. 7

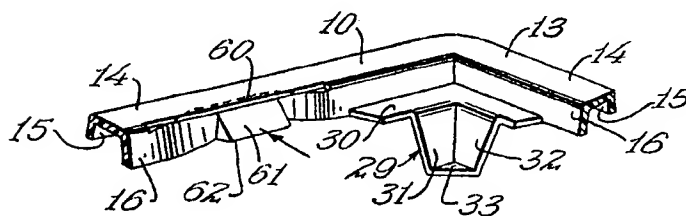


FIG. 8